

Scissor/Candlestick Phone Application Note

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Identification:



Figure 1 - Candlestick with "Scissors Gate" with Spindle Base – Headset not shown

The classic Candlestick phone lasted in some railroad offices until the end of TT&TO (mid 1980s). Several mountings were available: A standard desk base, a "Scissors Gate" which allowed the candlestick mechanism to be held off the desk with a choice of mountings: spindle base screwed to the desk, wall mounts that screwed to a wall or the back of a roll-top desk and an arrangement like a Luxo lamp base that clamped to the edge of a flat surface. These show up on auctions and antique telephone dealer sites from time to time. The work space for your dispatcher or operator will determine which type to use, but they are all interchangeable electrically.

Examining and Wiring Your Candlestick Phone

Be sure to disassemble and inspect your candlestick when you receive it. These are all around 100 years old by now and they may be damaged. Many dealers (even reputable ones) sell most of their phones to people who want them as scenic accents, not as working phones, so they may not have been checked for completeness or damage. Most dealers and auction sellers will make good if they are notified immediately and you may have remedies from auction and payment services for damaged or missing parts if you act promptly. I have had clients send me phones without transmitters (microphones) and hook switches with no spacers or insulators so they couldn't possibly work. Don't let this happen to you!

Phone Disassembly:

The phone comes apart in two places:

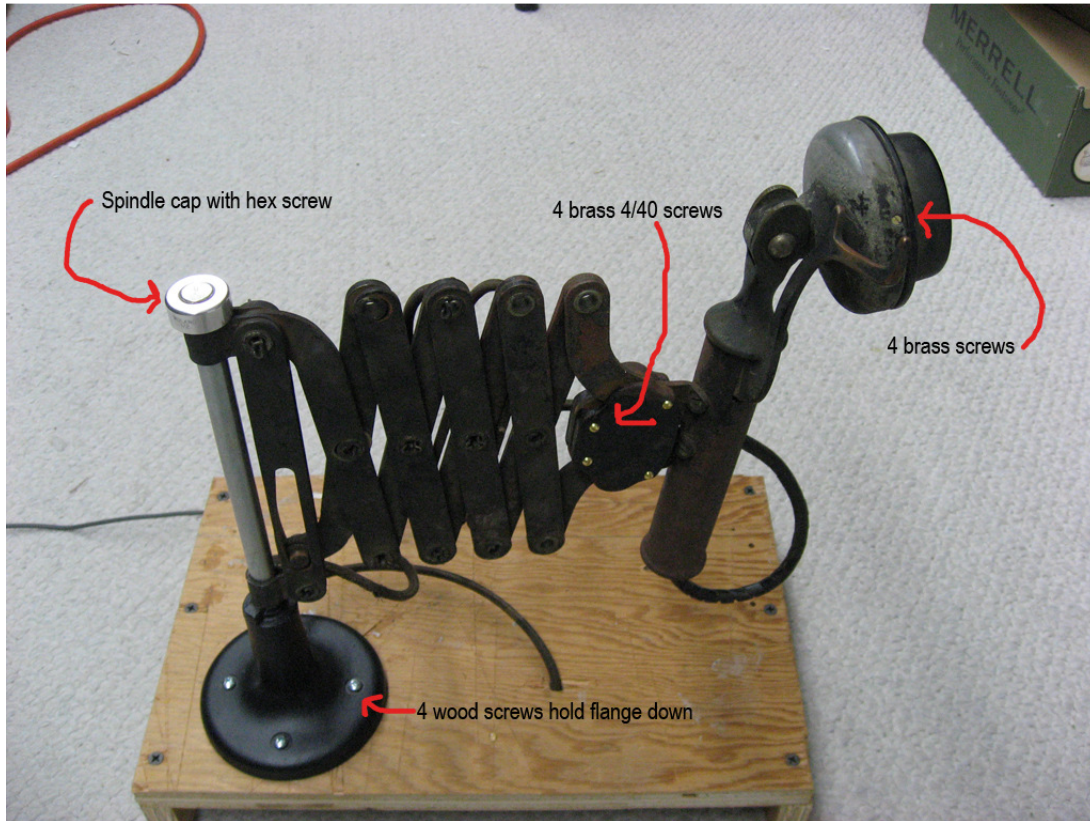


Figure 2 – Scissors Phone on temporary mount

The spindle flange is held with 4 wood screws, you can put it back together as it was or secure it to a desk and put the phone backboard below the desk. The candlestick phone itself comes off by removing the 4/40 brass screws from the end of the scissor and disassembling the end of the scissor. The candlestick comes apart by removing the mouthpiece with the 4 2-56 screws and removing the transmitter. The brass terminal comes out by removing the 4-40 screw at the bottom.

The mounting cord is held in place by the little clips that pop into the scissor hinges. You can easily make more by bending .020 wire or just bending up some paper clips.



Figure 3 - Bottom of Candlestick

Candle Stick Wiring

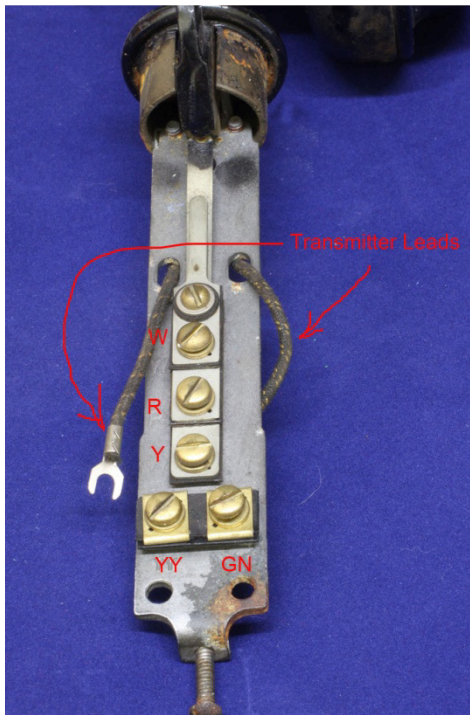


Figure 4 – Candle Stick Internals

You can use a piece of insulating tape (I use Kapton) to isolate the back contact from the other two so that YY is available as a tie point and W and R become the hook switch.

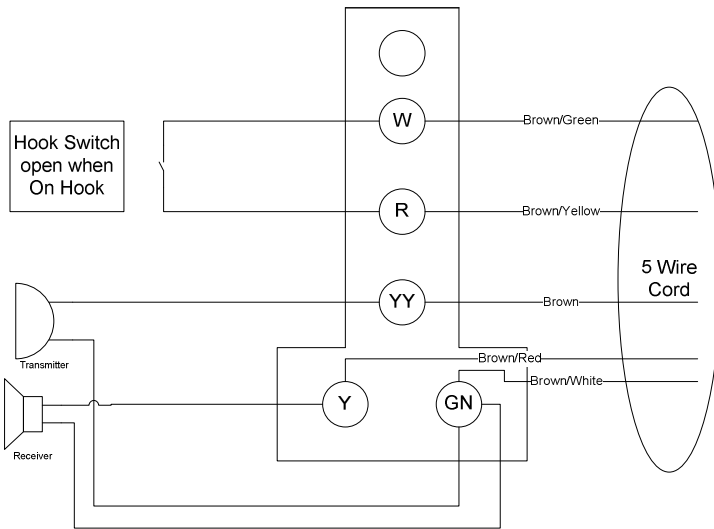


Figure 5 - Candle Stick Internal Wiring

Note YY and Y reversed on some phones

Candlestick	Line Cord	Head Set	Mic	Network	Footswitch
GN	Brn/GN	GRN		GN	
Y	BRN/RD	WH	GRN/RD	R	
YY	BRN/BL		WH	E1	WH (or Jumper to B on network if no foot switch)
R	BRN/BLK			C	
W	BRN/YL			L2	
				B	BLK

Table 1 – Connections (colors may vary depending on cable available)

Network Wiring

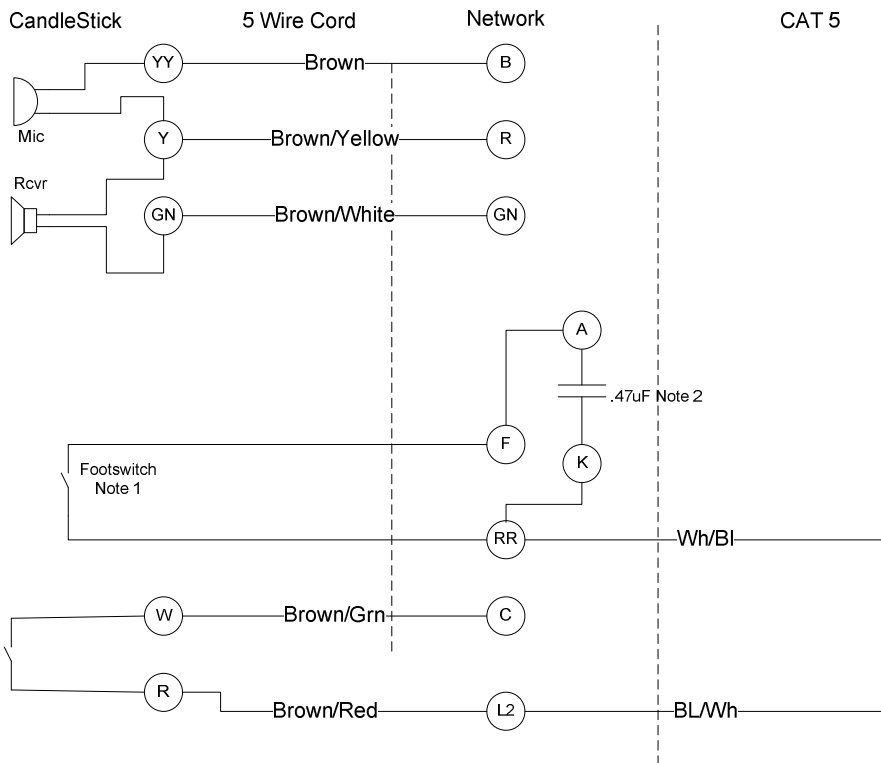


Figure 6 – Schematic

Notes:

1 – Footswitch is not required but since a receiver is generally used when a DS/OP phone is out in the layout, it serves to prevent pickup when the DS/OP is not using the phone, but allows the DS/OP to monitor the line (See note 2). If the footswitch is not used, move the tip connection from RR to F.

2 – This capacitor (between A and K) is really intended for isolating a ringer from DC. However it allows the user to monitor the line without loading the DC circuit and pulling up the Battery Feed Relay or EBF31A. Volume will be a little lower than when off hook. If more volume is desired in the monitor mode, put a 1.0 or 2.2 uF Mylar cap in parallel with A and K. If you don't want monitoring, omit the connection to A & K.

3 – This configuration is not how it was done in the day, but it does allow the Candlestick to be used with a modern speech network, which reduces sidetone (hearing yourself in your ear which is bad because it makes you talk more softly), puts more voice energy on the line, reduces pops and clicks and limits current to the set. 3 wires are used for the transmitter/receiver (there is a common connection, no polarity, and just one wire from the transmitter and one from the receiver – this is equivalent to a modern handset) and the remaining two are used to bring the hook switch back to the network.

Installation of Candlestick Phone:

Locate the phone wherever you want to the Dispatcher or operator to sit. The mic must reach up to a point where the user can comfortably lean over and talk directly into it. The horn around the transmitter is not for show: these old transmitters need a lot of sound pressure to work, so the user has to be able to get his snout into it! Note that the cord from the scissor to the backboard isn't very long so plan to locate the network close to the phone.

Run a piece of CAT 5 from the system back board to the phone. Connect the White/Blue wire to L2 on the network and the Blue/White wire to "RR".

The footswitch is connected between F and RR on the speech network (this is where a rotary dial would go and has a nice "pop suppression" circuit to keep the noise down as step on the footswitch to talk.

Position on Cat 5	Color	Designation	Purpose
1	Wh/bl	T	Tip of talk circuit (more or less ground)
2	Bl/wh	R	Ring of talk circuit (more or less – battery in the classic phone world, EBF31A makes this positive as it doesn't matter since we're not running through lead-sheathed cable and + is easier for most modelers to deal with)
3	Wh/Or	A	Switched side of contact aux closure from station – if used

4	Or/Wh	A1	Ground side of aux closure from station - if used
5	Wh/Grn	L	lamp supply to station (+ Anode side of LED)
6	Grn/Wh	LG	lamp ground to station (- Cathode side of LED)
7	Wh/Brn	Gnd	Ground (black) side of buzzer
8	Brn/Wh	(#)	Hot (+12) side of buzzer

Table 2 - Cat 5 color code